Subtitles Generator Manual
iGEM 2020 – HK_CPU-WFN-WYY

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Version: 26/10/2020

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1. Introduction

The subtitles generator is developed primarily for iGEM teams to make .srt and .vtt files for videos with ease.

This project was inspired by Pius. One day, he complained to me that typing .srt or .vtt files by hand was time-consuming and tiring, as you have to listen to the video for multiple times, and you can't even get accurate time codes for .vtt files. Also, conversion between both file formats is not easy to do by hand. This inspired me to develop a subtitles generator to ease his workload.

I started with only the play button and the 'add subtitles' button. It was simple, yet enough for the purpose. It was sufficient for internal use, but then a line of thought slipped through my mind: other iGEM teams have to do so too. Can I open put this on the iGEM website so that other teams can free up more of their time to do other meaningful things, such as making progress in their project.

Since I have high standards for everything I put into the general public, more function was added to the generator, one at a time: show/ hide subtitles, subtitles timetables, redo functions, and others. After one week, the generator is finally fully developed, and is ready for the general public to use it.

As the inventor of this generator, I hope that this generator can save your precious time for other stuff. Enjoy!

- Ricky Leung, HK_CPU-WFN-WYY
22/10/2020

2. Interface introduction

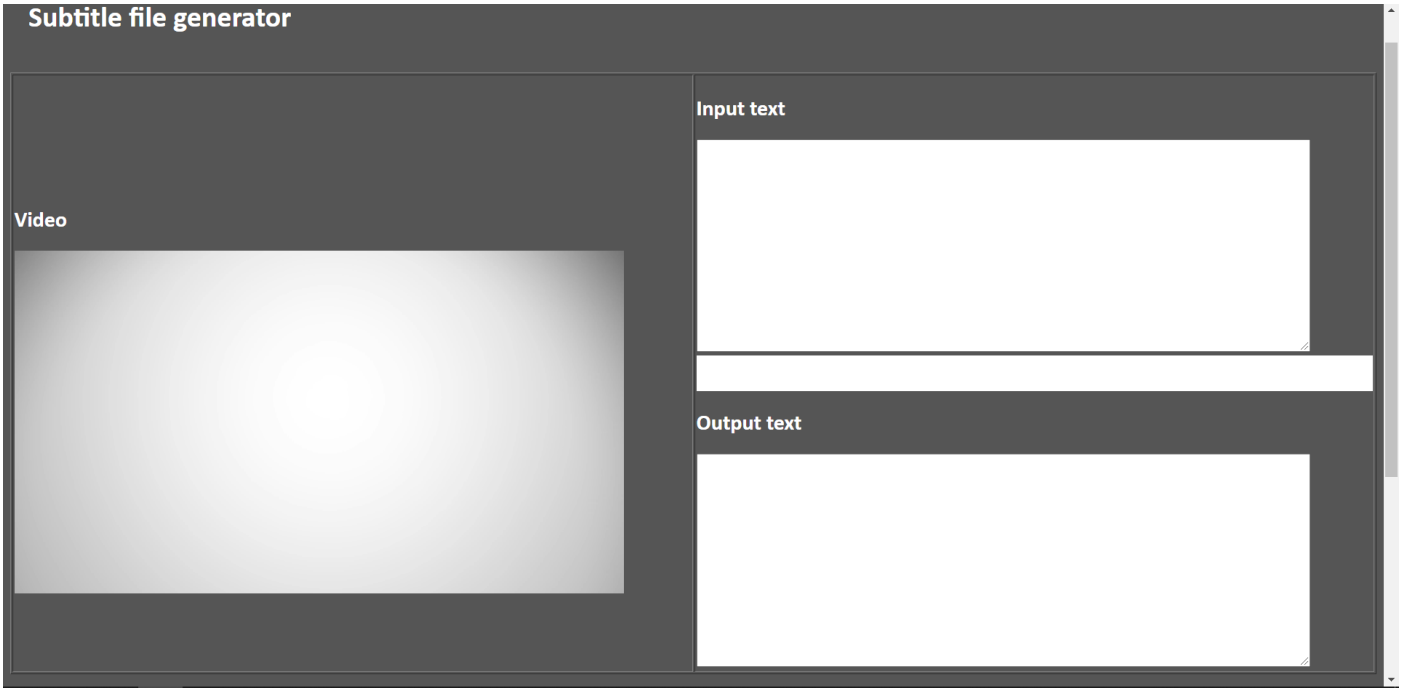


Fig. 1 Interface in Google Chrome/ Safari (Windows/ MacOS)

This is the interface that you will see when you open the subtitles generator. On the left side, there's your video in the browser. On the right side, there are 3 parts: input text, subtitles guide, output text.

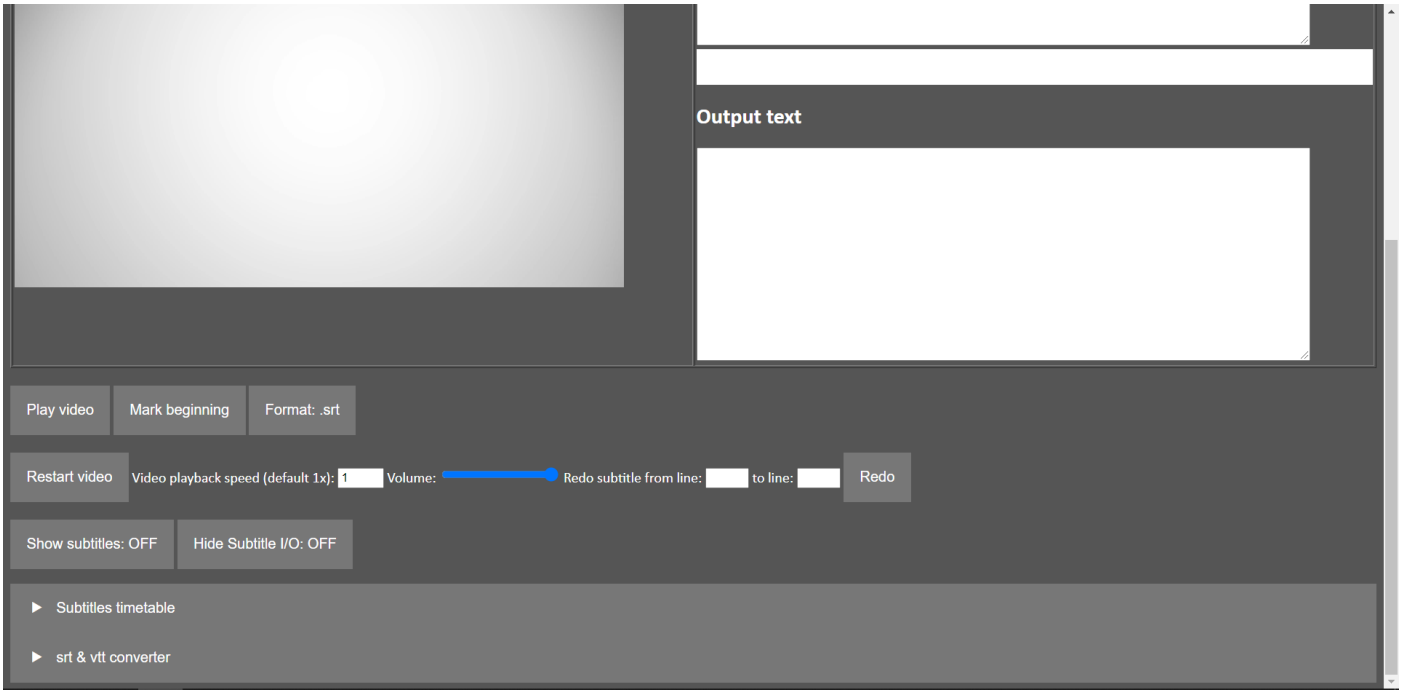


Fig. 2.1 Controls in Google Chrome (Windows)

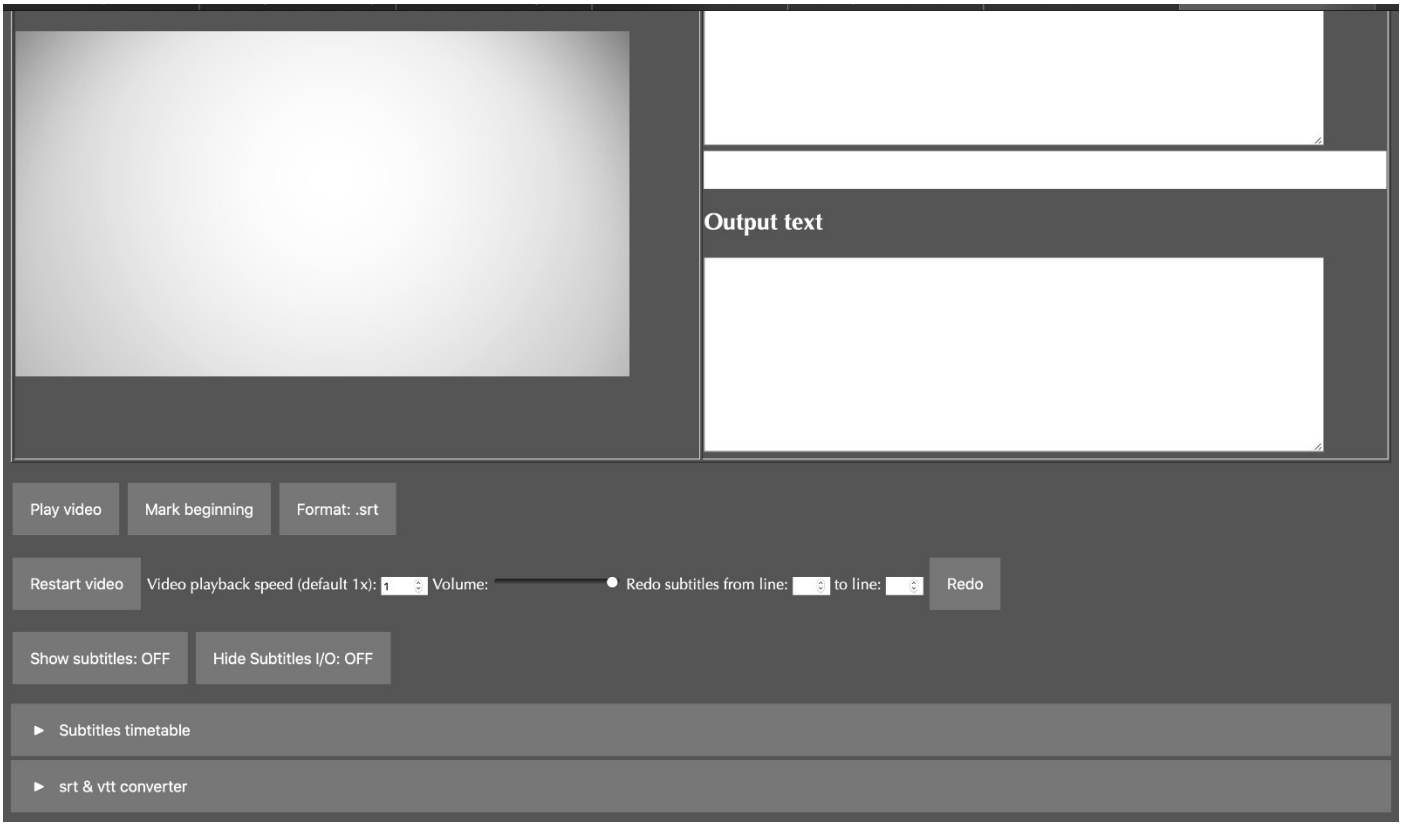
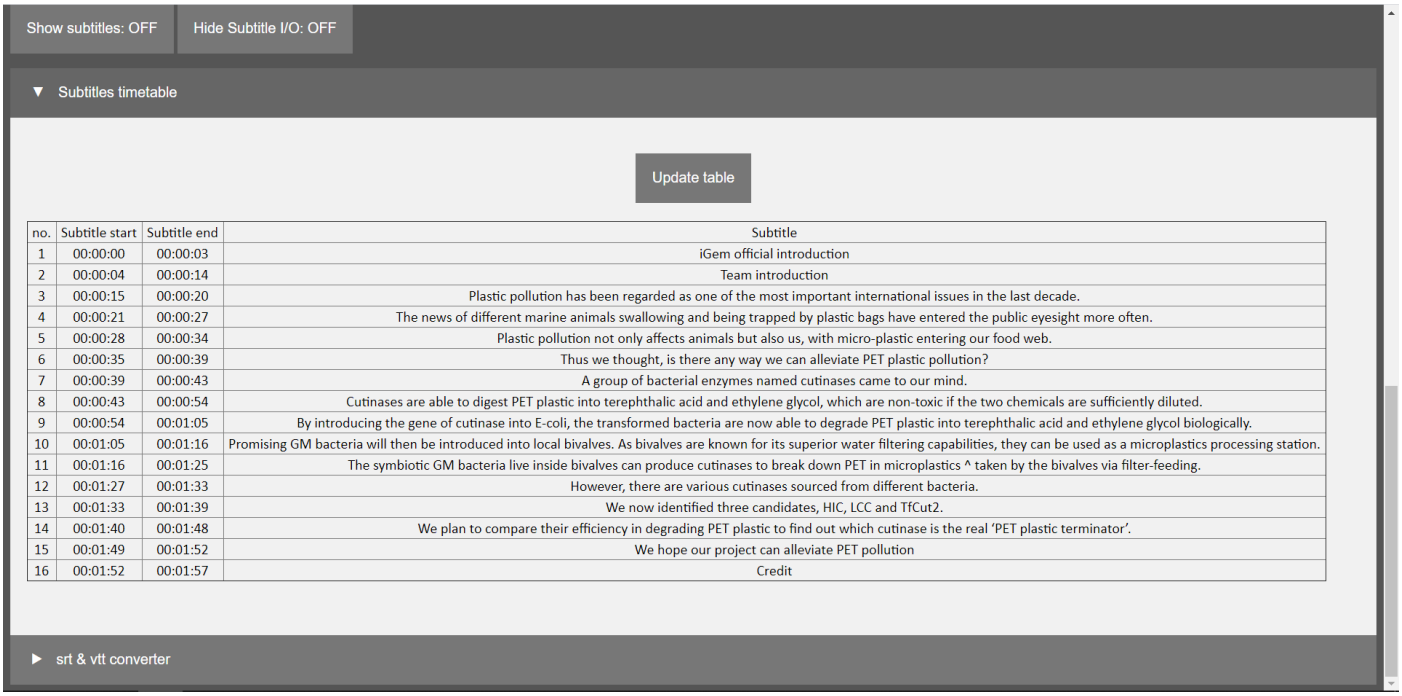


Fig. 2.2 Controls in Safari (MacOS)

In the controls part, the buttons and dials are separated into 3 categories: the first row is the primary controls, the second row is the video controls and the third row is the interface control.



no.	Subtitle start	Subtitle end	Subtitle
1	00:00:00	00:00:03	iGem official introduction
2	00:00:04	00:00:14	Team introduction
3	00:00:15	00:00:20	Plastic pollution has been regarded as one of the most important international issues in the last decade.
4	00:00:21	00:00:27	The news of different marine animals swallowing and being trapped by plastic bags have entered the public eyesight more often.
5	00:00:28	00:00:34	Plastic pollution not only affects animals but also us, with micro-plastic entering our food web.
6	00:00:35	00:00:39	Thus we thought, is there any way we can alleviate PET plastic pollution?
7	00:00:39	00:00:43	A group of bacterial enzymes named cutinases came to our mind.
8	00:00:43	00:00:54	Cutinases are able to digest PET plastic into terephthalic acid and ethylene glycol, which are non-toxic if the two chemicals are sufficiently diluted.
9	00:00:54	00:01:05	By introducing the gene of cutinase into E-coli, the transformed bacteria are now able to degrade PET plastic into terephthalic acid and ethylene glycol biologically.
10	00:01:05	00:01:16	Promising GM bacteria will then be introduced into local bivalves. As bivalves are known for its superior water filtering capabilities, they can be used as a microplastics processing station.
11	00:01:16	00:01:25	The symbiotic GM bacteria live inside bivalves can produce cutinases to break down PET in microplastics ^ taken by the bivalves via filter-feeding.
12	00:01:27	00:01:33	However, there are various cutinases sourced from different bacteria.
13	00:01:33	00:01:39	We now identified three candidates, HIC, LCC and TfCut2.
14	00:01:40	00:01:48	We plan to compare their efficiency in degrading PET plastic to find out which cutinase is the real 'PET plastic terminator'.
15	00:01:49	00:01:52	We hope our project can alleviate PET pollution
16	00:01:52	00:01:57	Credit

Fig. 3 subtitles timetable in Google Chrome/ Safari (Windows/ MacOS)

Scrolling down, you will see the subtitles timetable section. Click on the bar. In here, you can see all the subtitles with time codes listed generated based on the 'output text' area. You need to click the 'update table' button for it to work.

Fig. 4 srt & vtt converter in Google Chrome/ Safari (Windows/ MacOS)

Clicking open the second bar, you will find 2 input/ output boxes: ‘srt here’ and ‘vtt here’, and 2 buttons, ‘to srt’ and ‘to vtt’.

By now, you should be familiar with the layout of the subtitles file generator. In the next section, we will navigate you through all the functions that the subtitles generator has to offer.

3. How to use the Subtitles Generator

3.1 Add subtitles to videos

3.1.1 Rename your video

Before start adding subtitles, make sure your video file is in .mp4 format and your file has been renamed to video_add_sub(.mp4), case sensitive. This is important as the subtitles generator will recognize the video by its file name and extension.

Open the subtitles generator. You should now be able to see your video appear in the embedded video player.

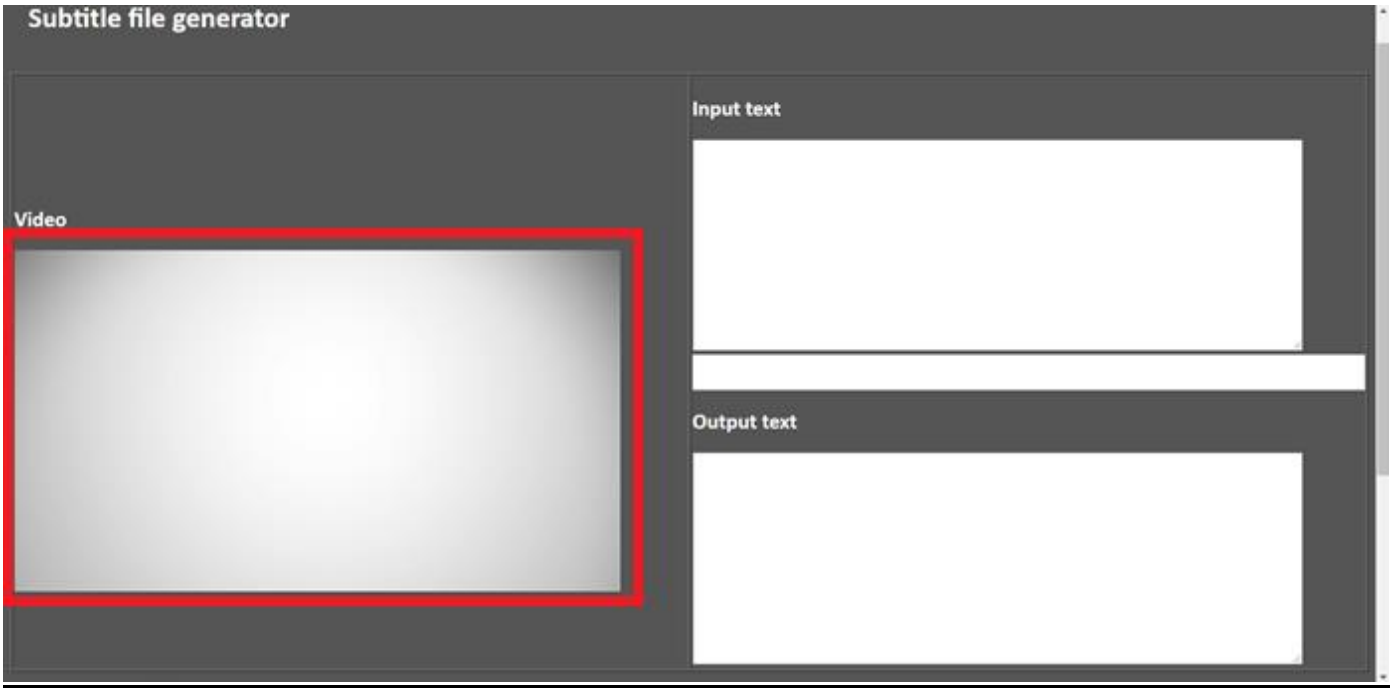


Fig. 5 Video successfully recognized in Google Chrome/ Safari (Windows/ MacOS)

If the video is unsuccessfully recognized, the interface will collapse.

Fig. 6 Video unsuccessfully recognized in Google Chrome/ Safari (Windows/ MacOS)

3.1.2 Prepare your subtitles input

Now your video is ready for adding subtitles. Put your subtitles in the 'input text' box. Please note that the generator recognizes a line break (enter) as 1 line of subtitles, so use your enters wisely to break up long lines.

Example:

The International Genetically Engineered Machine (iGEM) Foundation is an independent, non-profit organization dedicated to the advancement of synthetic biology, education and competition, and the development of an open community and collaboration. - https://igem.org/About

In this case, no line breaks are inserted. The subtitles generator will recognize the input as follows:

Line	Subtitles
1	The International Genetically Engineered Machine (iGEM) Foundation is an independent, non-profit organization dedicated to the advancement of synthetic biology, education and competition, and the development of an open community and collaboration.

What happens if we insert line breaks wisely?

Example:

The International Genetically Engineered Machine (iGEM) Foundation is an independent,
non-profit organization dedicated to the advancement of synthetic biology,
education and competition, and the development of an open community and collaboration.

Line	Subtitles
1	The International Genetically Engineered Machine (iGEM) Foundation is an independent,
2	non-profit organization dedicated to the advancement of synthetic biology,
3	education and competition, and the development of an open community and collaboration.

As you can see, this can make sure the subtitles are displayed within 2-3 lines, instead of taking up most of the screen.

3.1.3 Choose subtitles format

Now you can toggle the subtitles generator format. In this version, 2 formats are supported: .srt and .vtt. You should not change your subtitles format once you started adding subtitles.

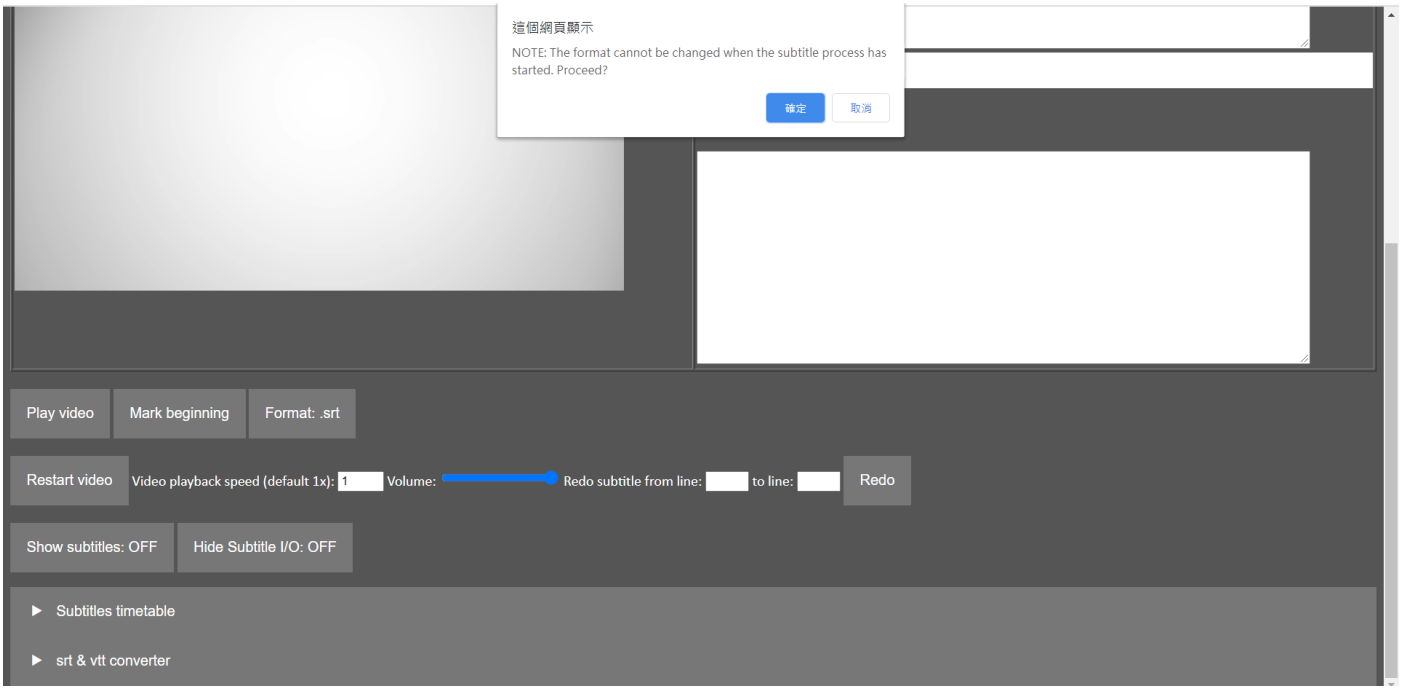


Fig. 7.1 Confirmation prompt when changing format in Google Chrome (Windows)

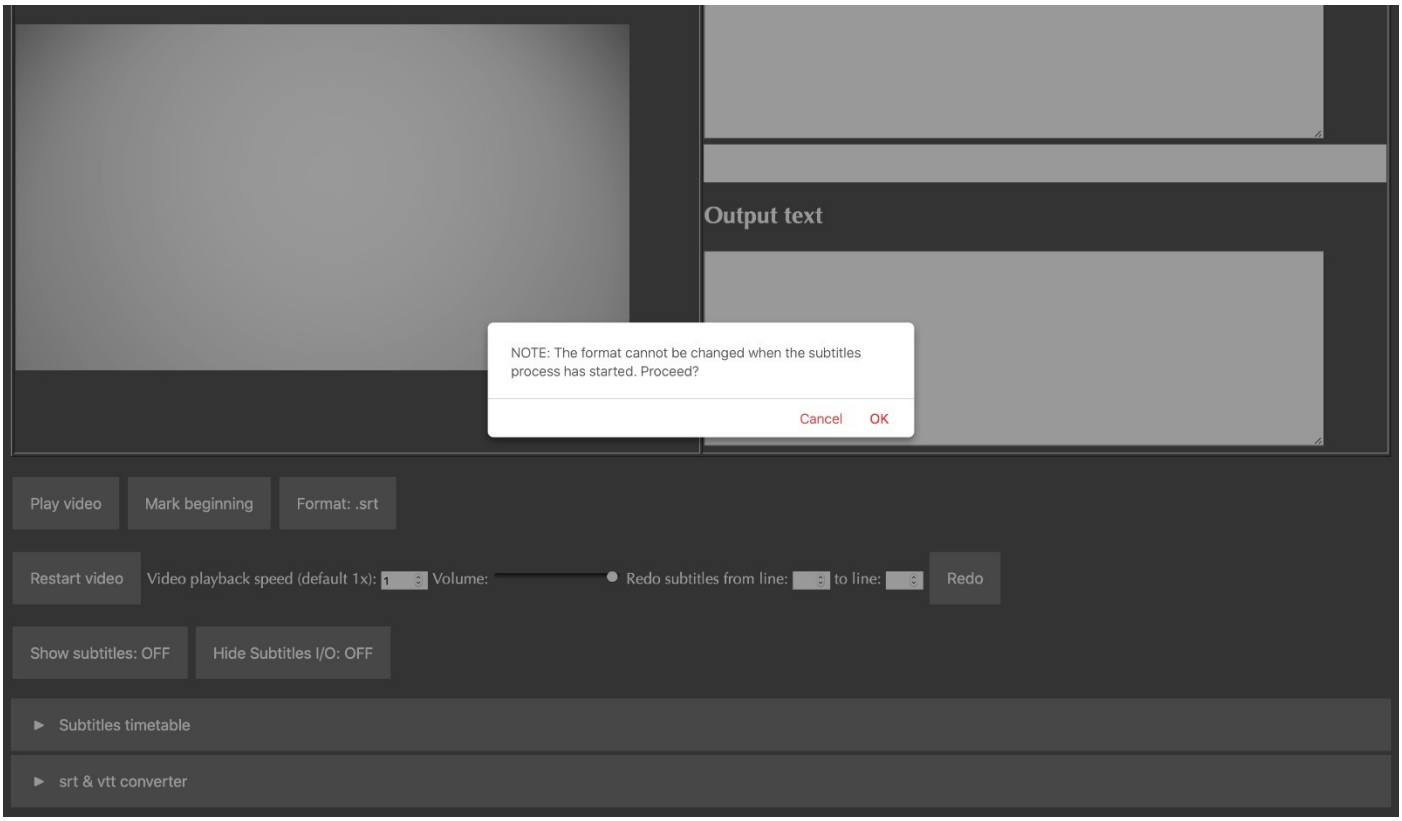


Fig. 7.2 Confirmation prompt when changing format in Safari (MacOS)

You can change the formatting of your .vtt subtitles here after clicking ‘confirm’.

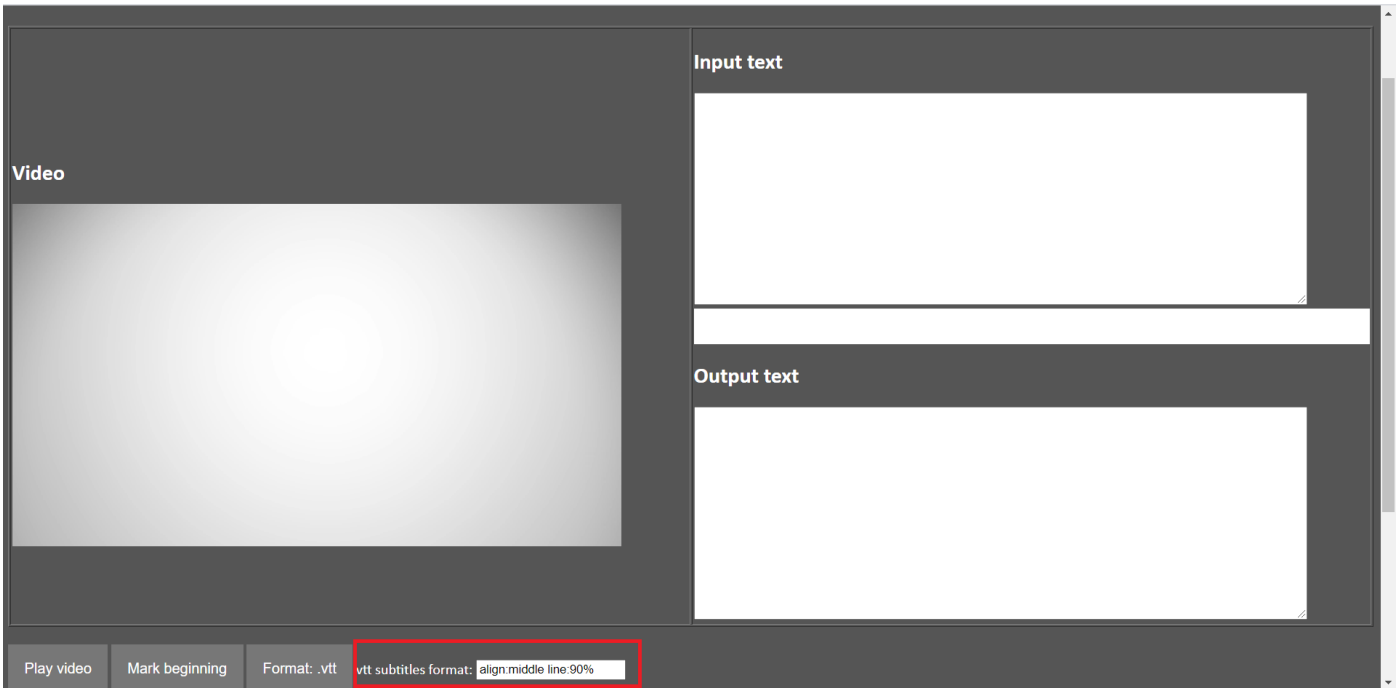


Fig. 8 .vtt formatting option in Google Chrome/ Safari (Windows/ MacOS)

3.1.4 Adding subtitles

Now you can start adding subtitles. To add subtitles, click the 'Mark beginning/ end' button.

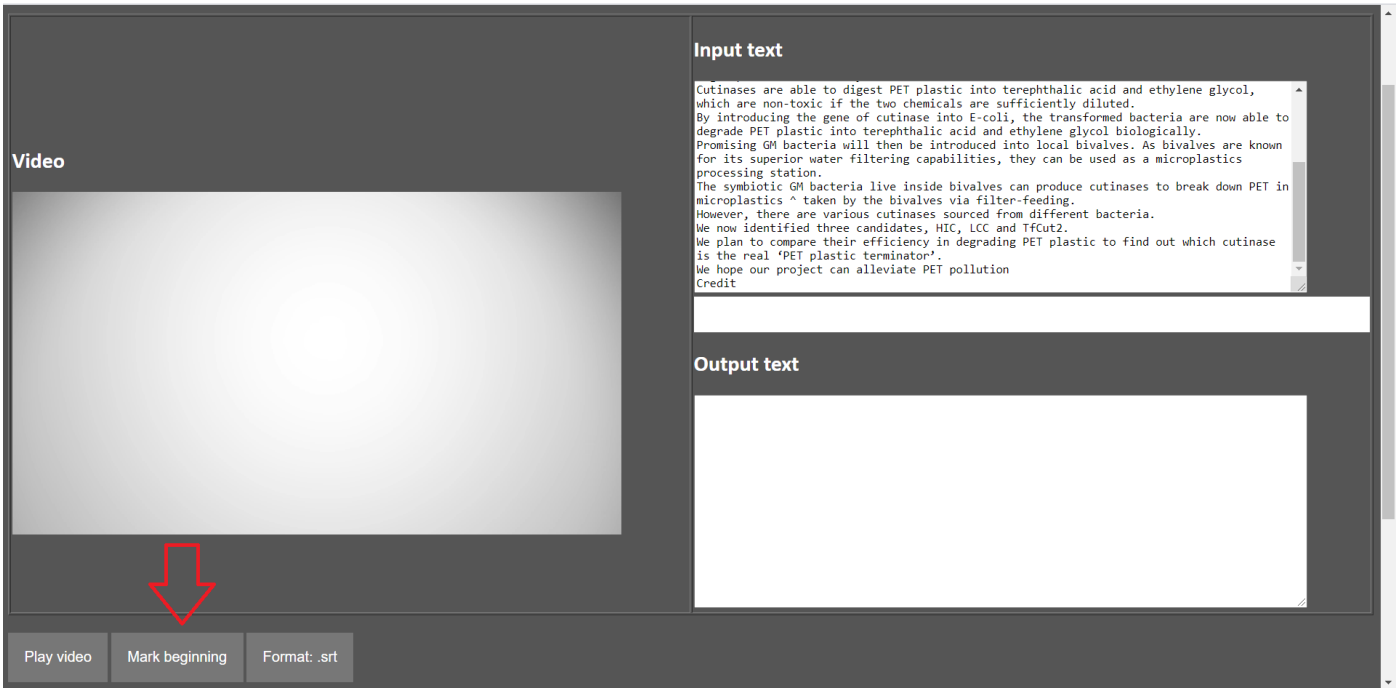


Fig. 9 Mark beginning/ end button in Google Chrome/ Safari (Windows/ MacOS)

When you click on the button, the generator will record your time code of your video at that moment.

Fig. 10.1 Click of the mark beginning/ end button without playing the video (i.e. time code: 00:00:00) in srt mode

If you switch the format to .vtt, the output will generate the subtitles in .vtt format.

Fig. 10.2 Click of the mark beginning/ end button without playing the video (i.e. time code: 00:00:00) in vtt mode

3.1.5 Subtitles guide

By now, you should see the subtitles guide working. The subtitles guide serves to help you navigate through your subtitles so that you know when to click the 'mark beginning/ end' button. The first line shows the previous line, the second line shows the current line and the third line shows the next line.

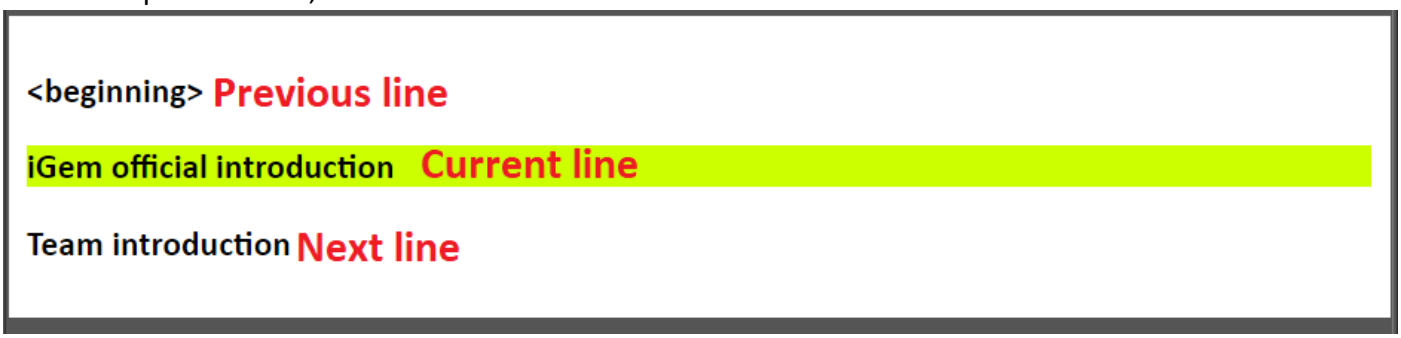


Fig. 11 Subtitles guide in action

Now click the play button. The video should start playing. Then, click the 'Mark beginning/ end' buttons accordingly. This is what you should get in the 'output text' box after clicking through the whole video (excerpt from the whole file):

```
1
00:00:00-->00:00:03
iGem official introduction

2
00:00:04-->00:00:14
Team introduction
```
(.srt mode)

```
WEBVTT - Title here

1
00:00:00.102-->00:00:05.462 align:middle line:90%
iGem official introduction

2
00:00:06.800-->00:00:15.227 align:middle line:90%
Team introduction
```
(.vtt mode)

The time code and the subtitles will be different as you click through them, and now you have your subtitles ready to go.

3.2 Preview subtitles

Now you have you subtitles ready. If you want to preview it, click on the 'Show subtitles' button. If you did not generate your subtitles in this generator or you are previewing it at a later date, you can paste the subtitles in 'output text' and that will still work.

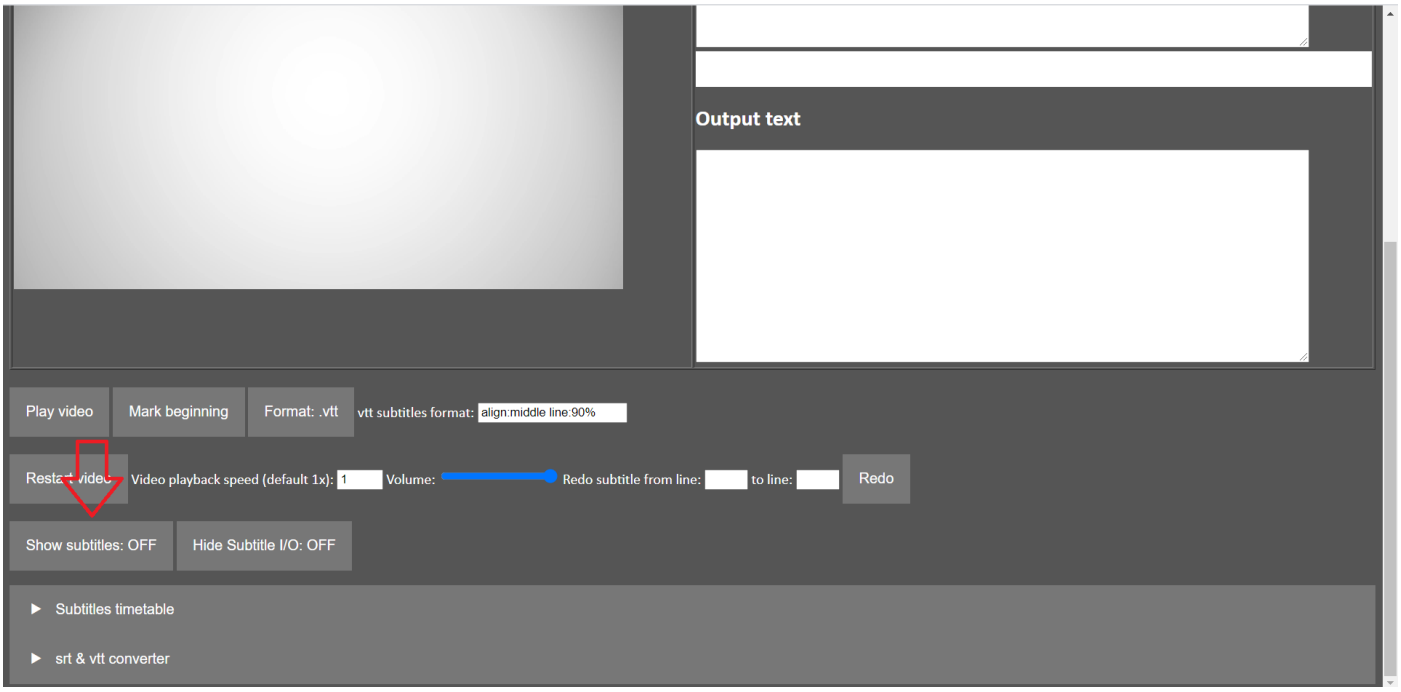


Fig. 12 Show subtitles button in Google Chrome (Windows)

The internal validation system will give an error message when:
1) the format chosen is not the correct format (e.g. pasted .vtt when in .srt format mode);
2) the format chosen is correct, but the format of the subtitle file is not the correct format (e.g. extra spaces in one of the lines)

The validation system can identify most errors. If your subtitles passed the validation, you should be able to see them as soon as you start playing the video.

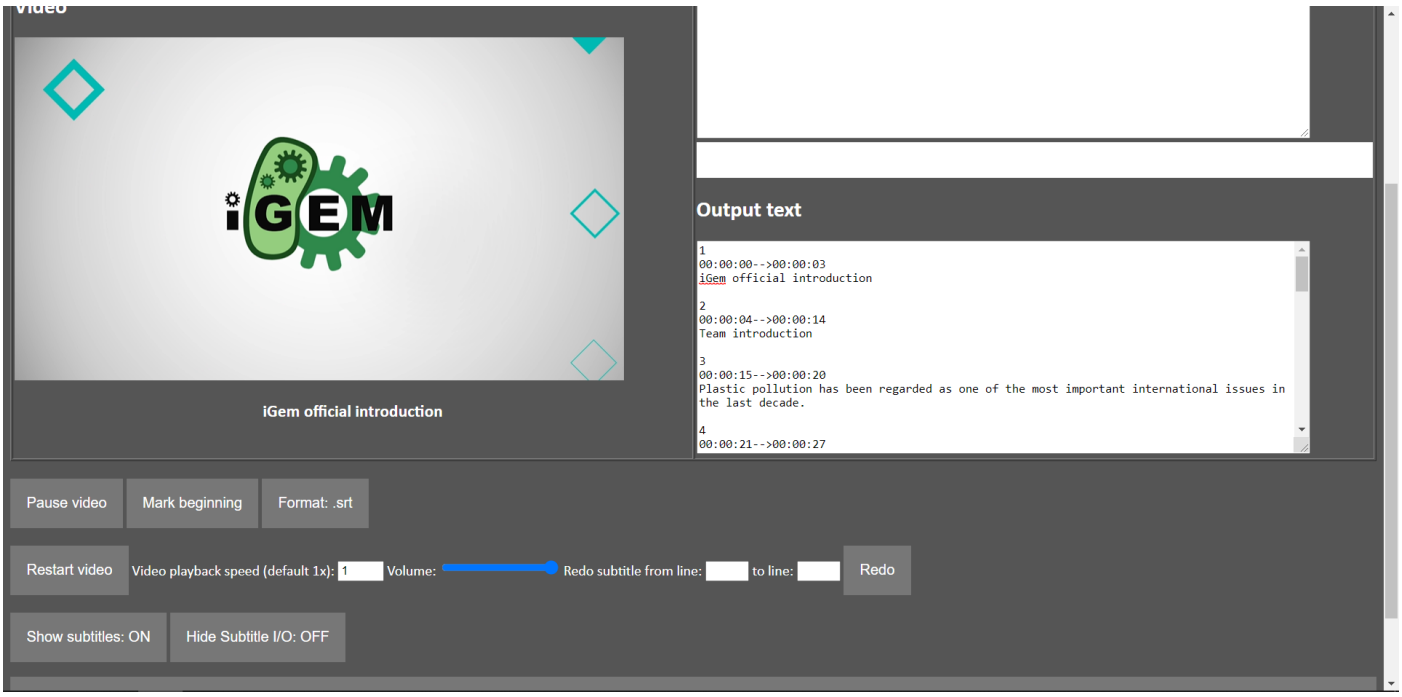


Fig. 13 Show subtitles button in Google Chrome/ Safari (Windows/ MacOS)

For better preview experience, you can click on the 'Hide subtitle I/O' button. This will hide the right side of the subtitles generator to give you a bigger screen with bigger subtitles.

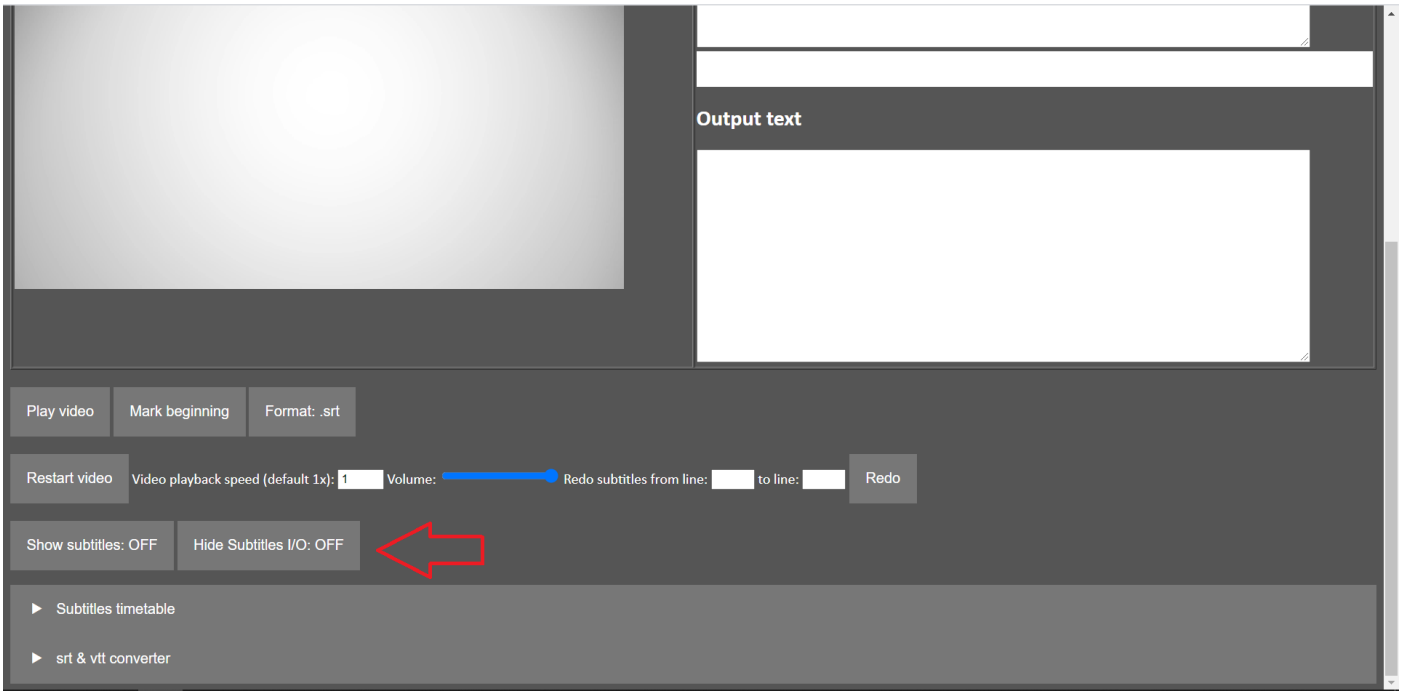


Fig. 14 Hide subtitles I/O button in Google Chrome/ Safari (Windows/ MacOS)

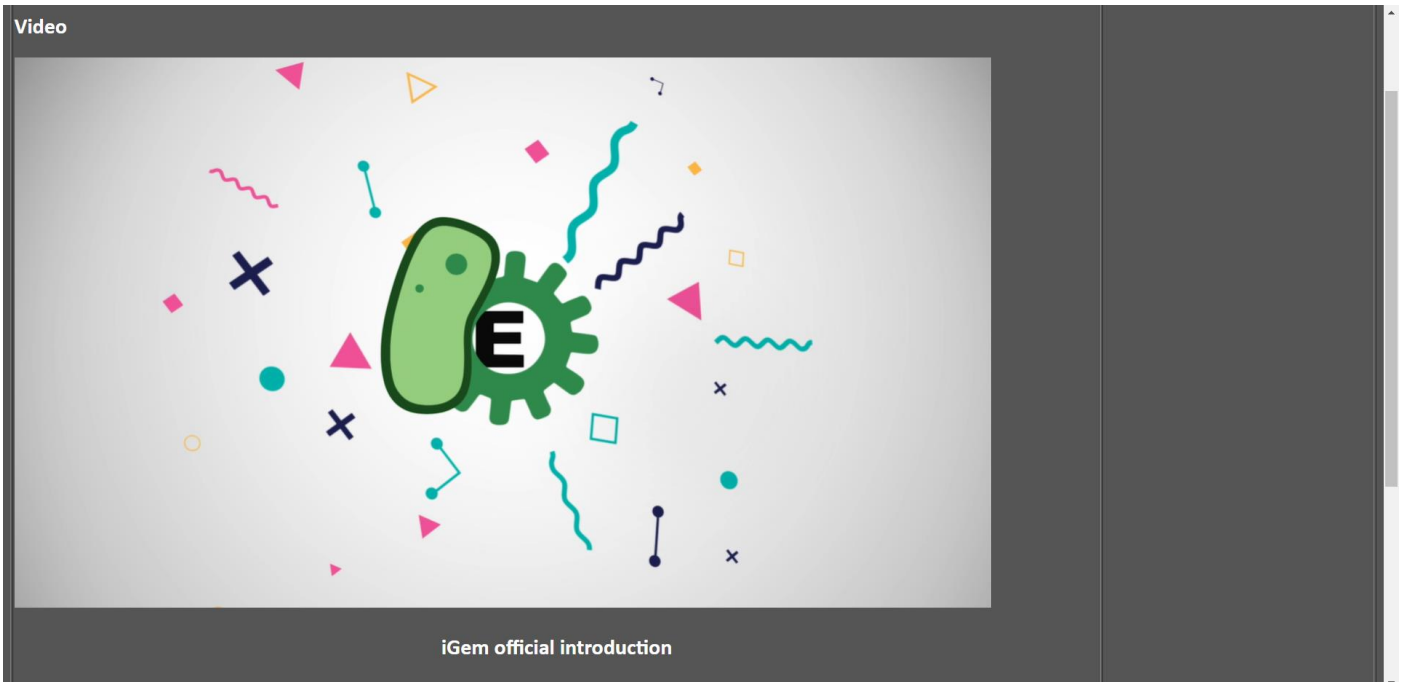


Fig. 15 Subtitles I/O hidden in Google Chrome/ Safari (Windows/ MacOS)

3.3 Subtitles timetable

The subtitles timetable serves as a table that you can easily go back and check if the audio and subtitles time is in sync. Paste your subtitles into the 'output text' box. Open the subtitles timetable section and click 'update table'. The subtitles will also pass through the validation process. If no errors are found, the table will be generated successfully (Fig. 3.1, 3.2).

You can click on the time codes on the 'subtitles start' column to jump to that position.

no.	Subtitles start	Subtitles end	Subtitles
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2	00:00:04	00:00:14	Team introduction
3	00:00:15	00:00:20	Plastic pollution has been regarded as one of the most important international issues in the last decade.
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15	00:01:49	00:01:52	We hope our project can alleviate PET pollution
16	00:01:52	00:01:57	Credit

Fig. 16 Subtitle start column (table generated using .srt format)

3.4 Redo subtitles

If you found some of your subtitles are not showing up at the right time, you can use the redo subtitles function to correct it. You are requested to redo subtitles on a range. The 'input text' box and the 'output text' box should contain the subtitle script and the subtitle text (.srt or .vtt) need to be redone.

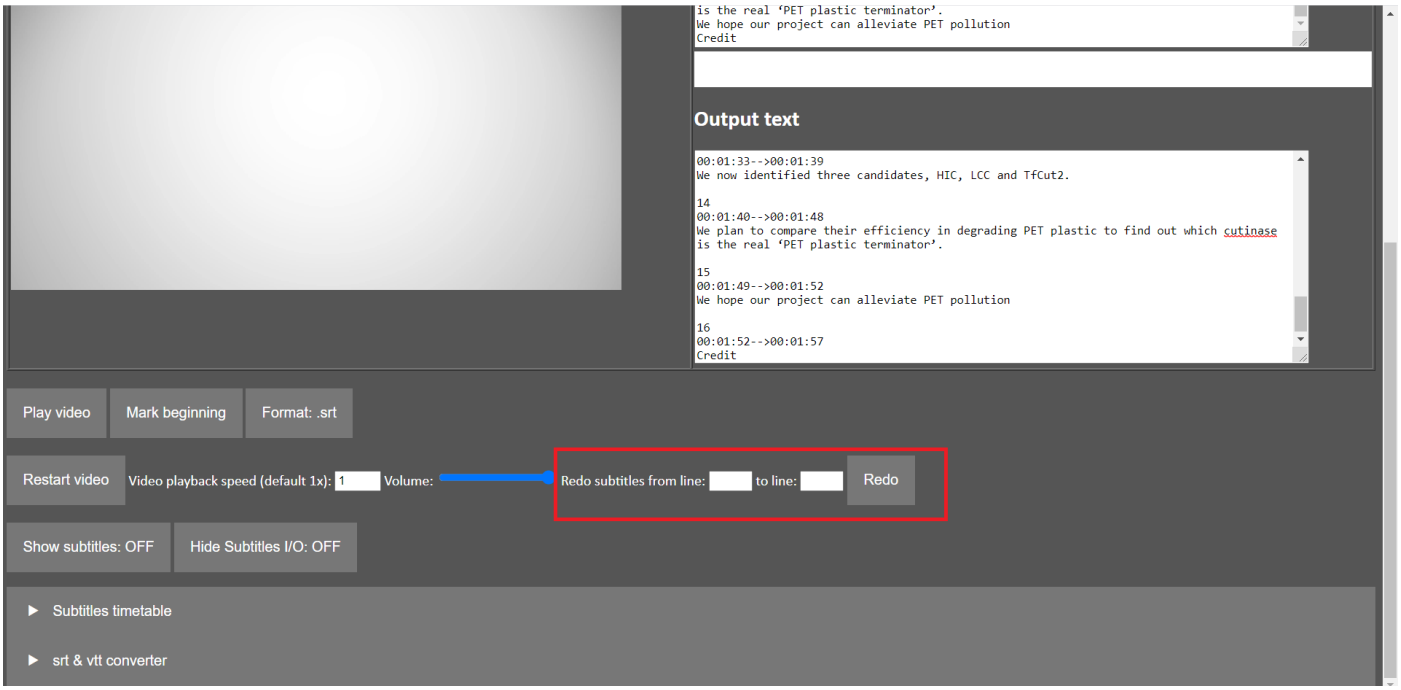

Fig. 17 Redo in Google Chrome/ Safari (Windows/ MacOS)

After entering a line range and clicking the 'redo' button, the video player will automatically jump to the start of the first line in your specified range. The subtitles process is the same as in section 3.1. After the process, you will find that the changes to time codes have been made to the 'output text' box.

3.5 srt & vtt converter

If you want to convert .srt to .vtt or vice versa, the converter is built for this exact same purpose. Paste your subtitles script (in srt format) into the ‘srt here’ box or paste into the ‘vtt here’ box if the subtitle is in vtt format. Then, click the corresponding button (to srt or to vtt). The converted subtitles will appear in the corresponding box (srt here or vtt here). If you convert .srt to .vtt, you will be prompted to enter the formatting of the subtitles. For .srt to .vtt, the time is preserved by adding .000 to the end of the time codes. For .vtt to .srt, the time is corrected to the nearest second using the floor function.

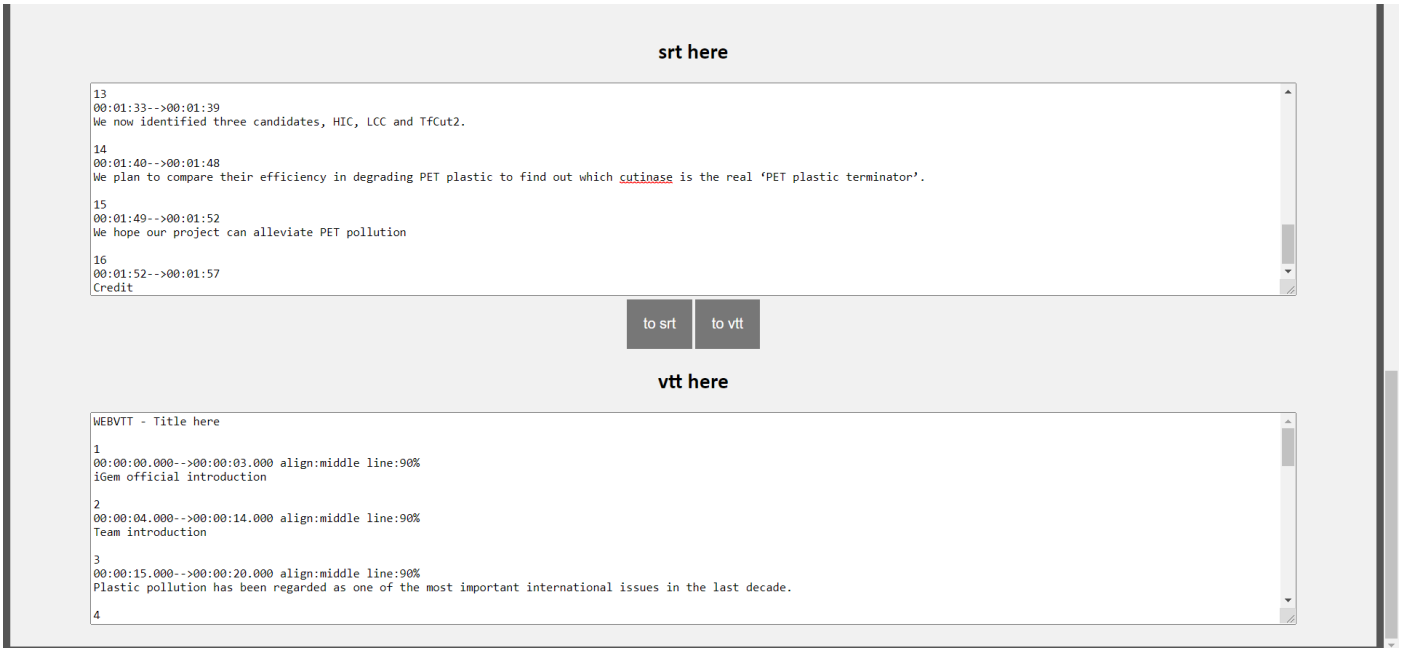

Fig. 18 Converting .srt to .vtt

3.6 Auxiliary functions

This is a list of auxiliary functions that you can use in the subtitles adding process.

3.6.1 Restart video

Set the time of the video to the start.

3.6.2 Video playback speed

Set the playback speed of video (from 0.01x to 10x), with steps of 0.01x. This may be useful when adding subtitles to fast-speaking videos.

3.6.3 Volume

Set the volume of the video (from 0% to 100%).

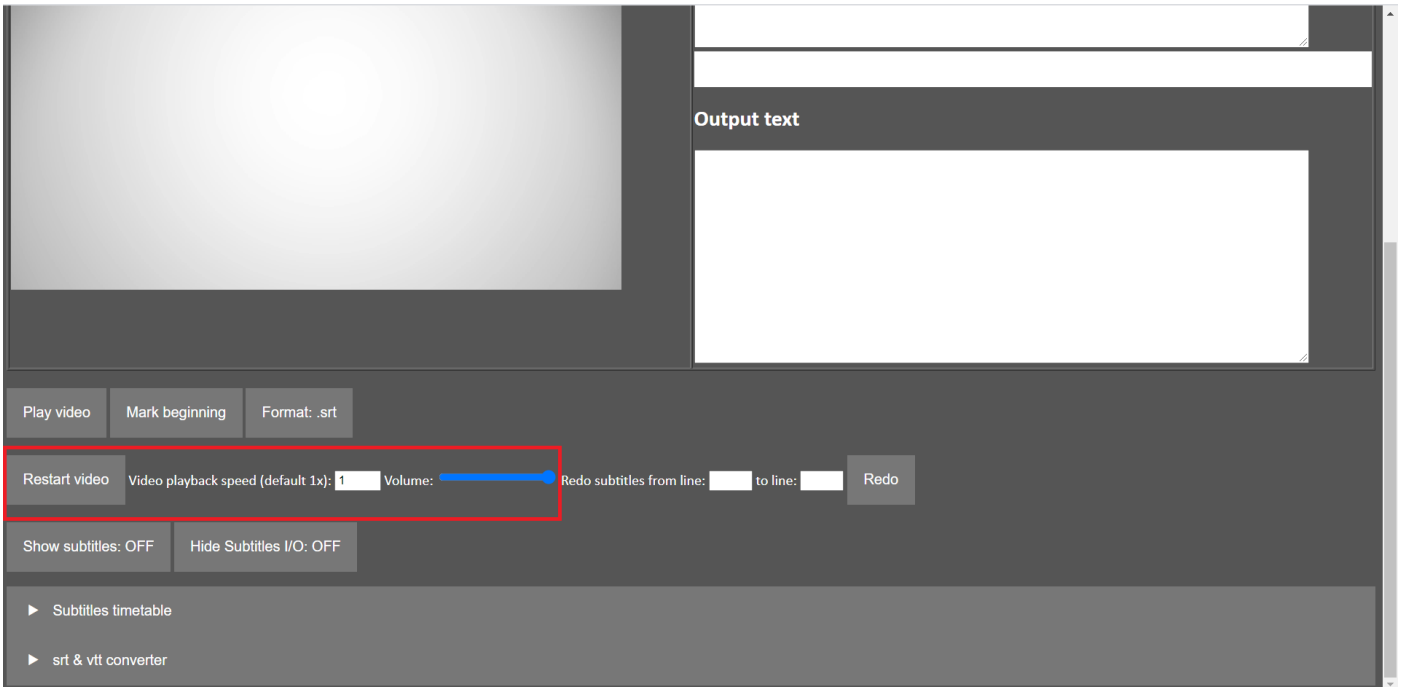

Fig. 19.1 Auxiliary functions in Google Chrome (Windows)

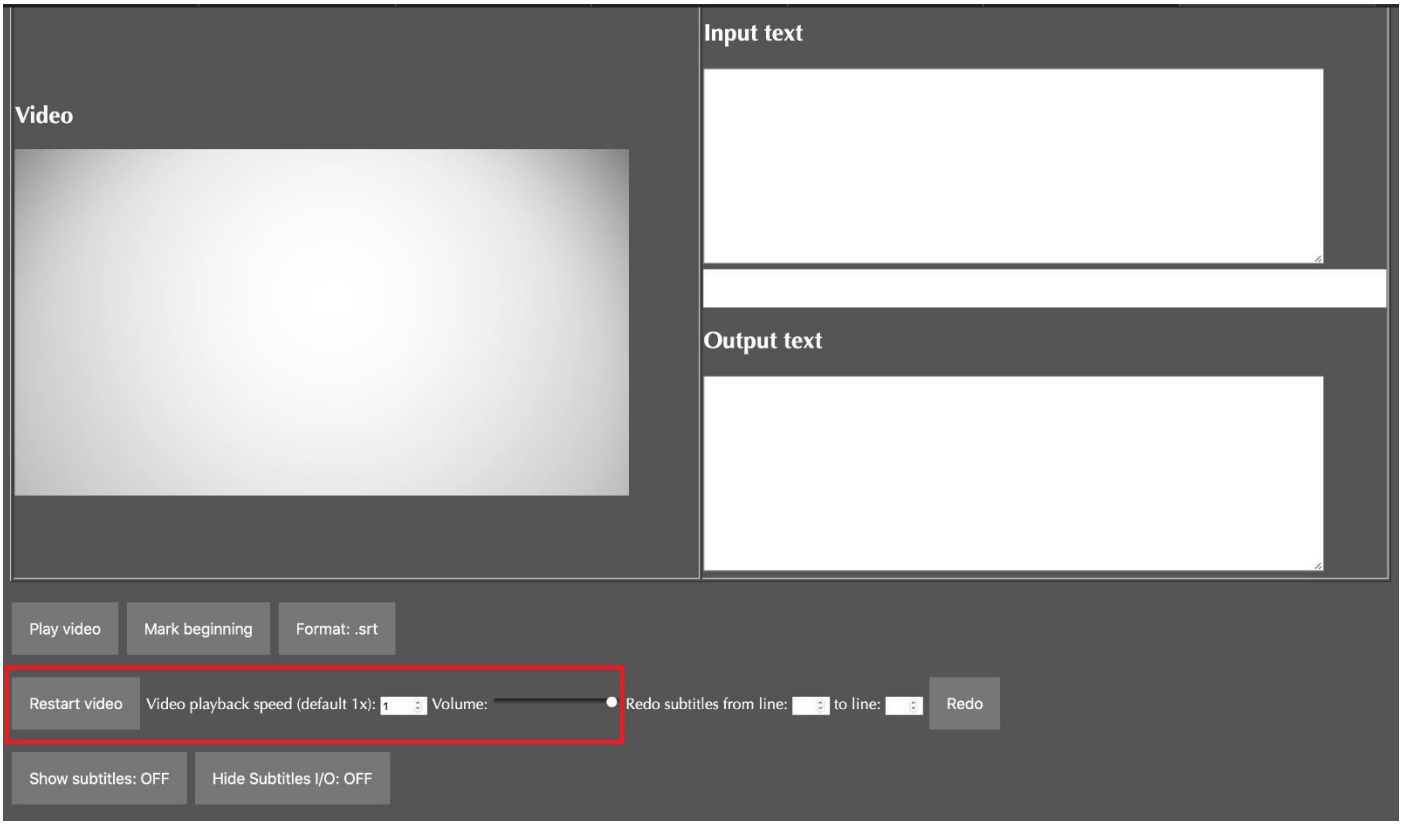

Fig. 19.2 Auxiliary functions in Safari (MacOS)

4. Known limitations

1. Due to the limitations of the validation function, currently the Subtitles Generator can only handle videos of length of less than 100 hours (i.e. max 99 hours, 59 minutes, 59 seconds).
2. If you discover any bugs/ limitations, please notice us by sending an email to hk.cpuwfnwyy@gmail.com with title 'Subtitles Generator bug/ limitation'. Any help will be greatly appreciated.